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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,718	07/20/2005	James Timothy Cronin	CH2883USPCT	2991

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EXAMINER	
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1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/539,718	CRONIN ET AL.	
	Examiner	Art Unit	
	Ngoc-Yen M. Nguyen	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 May 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *20-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *20-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 20-25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

There is no sufficient support in the instant specification for the two distinct mixing steps, i.e. steps b) and c). Applicants urge that support for step c) can be found on page 5, lines 27-30 and page 6, lines 34-37; however, page 5, lines 27-30 only disclose that the product of the passivation of vanadium oxychloride in crude titanium tetrachloride discharge with an organic oil is a passivating agent for aluminum chloride but there is no mention that the product of the passivation of vanadium oxychloride is mixed with the crude titanium tetrachloride in a separate "mixing" step; similarly, page 6, lines 34-37 disclose that the reaction product of the passivating agent with vanadium oxychloride can function as an aluminum passivating agent but no separate “mixing” step as required in step c) of the instant claim 20.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 21, it is unclear if the step "a)" is carried out before or after step a) or any other step required in the independent claim 20. Also, there is no clear antecedent basis for "the amount of a titanium oxychloride in the product" and "the titanium oxychloride concentration measured in-process". It is unclear how the adding of aluminum passivating agent is adjusted based on comparison of the titanium oxychloride concentration measured in-process with an aim point?

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 20, 22-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frey et al (2,592,021) in view of Robinson (4,246,022) or the admitted prior art (the preamble of cancelled Jepson claim 12).

Frey '021 discloses a continuous process for removing coloring impurities from an impure liquid chloride of a metal of Group 4 of the periodic system, which comprises

continually flowing into a reaction zone said chloride and a relatively small amount of an organic compound from the group consisting of hydrocarbons and compounds of carbon, hydrogen and at least one substituent from the group consisting of hydroxy, oxy, keto, amino, and carboxy radicals, continuously heating said organic compound in a liquid body of said chloride in said zone at a temperature between 100 and 500°C at which said compound carbonizes therein until a finely dispersed carbonization product is formed and until said impurities are taken up by said carbonization product, continuously distilling purified chloride of said metal from said zone, continually withdrawing part of the liquid therefrom, and separating purified metal chloride from the carbonization product in the withdrawn liquid holding the impurities (note claim 10).

The liquid metal chloride of Group 4 can be titanium tetrachloride, the coloring impurities can be vanadium chloride and there is a small amount of residual vanadium in the purified titanium tetrachloride product (note Examples 1 and 4), this fairly teaches that the vanadium chlorides are not eliminated as required in the instant claim 23.

The organic compound that is used as purifying agents can be animal and vegetable fats and oil (note column 3, lines 21-24), such as linseed oil (note Example 1), or petrol, mineral oils (note column 3, lines 29-32). Without a showing of criticality or unexpected results, the use of a hydrogenated naphthenic oil is not seen as a patentable difference because Frey '021 teaches that petrol, crude oil, etc. can be used.

In the process of Frey '021, either the "distilling" step or the step of separating purified metal chloride from the carbonization product in the withdrawn liquid holding the

impurities is considered as the claimed step e) to separate the easy-to-separate vanadium compound from the purified titanium tetrachloride.

For step c) since the process of Frey '021 can be carried out continuously, the subsequent incoming crude titanium chloride would come into contact with the carbonization product that had taken up from the previous crude titanium chloride (note Example 1).

The difference is Frey '021 does not disclose that the crude titanium chloride also contains aluminum chloride impurity.

Robinson '022 discloses that the crude titanium tetrachloride normally contains aluminum chloride, niobium chloride and vanadium chloride as impurities and by treating the titanium tetrachloride with mineral oil, the above impurities can be removed (note column 1, lines 38-43).

Alternatively, the admitted prior art is applied to teach that the crude titanium tetrachloride obtained from the carbochlorination of titanium-containing materials comprises titanium tetrachloride, aluminum chloride and vanadium chloride (note preamble of the cancelled Jepson claim 12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the process of Frey '021 to treat crude titanium tetrachloride that contains not only vanadium chloride but also aluminum chloride as impurities because Robinson '022 or the admitted prior art fairly suggests that these are common impurities for the crude titanium chloride. For the combined teaching of Frey '021 and either Robinson '022 or the admitted prior art, the process of the combined teaching has

all the positive process steps as those of the instant claim 20, thus, the aluminum chloride impurity would inherently be removed.

Claims 2—25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frey '021 in view of Kay et al (Kay '881, 2,600,881) and Cronin et al (2001/0016182).

Frey '021 is applied as stated above.

The difference is Frey '021 does not disclose the aluminum impurity and the step of detecting the amount of titanium oxychloride to adjust the amount of aluminum passivating agent.

Kay '881 is applied to teach that aluminum chloride is a common impurity in the crude titanium tetrachloride beside the vanadium chloride and it is desirable in the art to remove the aluminum chloride.

Kay '881discloses a process for the removal of aluminum chloride in solution with liquid titanium tetrachloride which comprises mixing with said liquid an amount of water sufficient only to react with the active aluminum chloride to be removed therefrom, and then separating the titanium tetrachloride from the resulting aluminum fluoride complex (note claim 1) by distillation (note claim 2).

Kay '881 teaches that the use of excess water is undesirable because loss of titanium values will occur due to formation of titanium oxychloride and the like (note column 5, lines 31-36). Kay '881 further teaches that besides the aluminum chloride impurity, the titanium tetrachloride contains other impurities such as vanadium (note table in column 6 and Example I). After the aluminum chloride is removed, the titanium

tetrachloride is subjected to another purification step to remove color-imparting impurities such as a chloride of vanadium (note column 6, lines 30-35).

Cronin '182 teaches that aluminum chloride present in the crude titanium tetrachloride is a highly corrosive material. It both quickly and severely attacks the metal materials of construction in the purification systems (note paragraph [0002]). The real-time control loop combined with the location of the addition of the passivating agent minimizes both the losses of titanium value from titanium tetrachloride reaction with excess concentrations of passivating agent and losses of service time from corrosion equipment and the formation of unwanted deposits (note paragraph [0039]).

Cronin '182 discloses an in-process, real-time control loop capable of controlling the passivation of aluminum chloride formed in the chlorination of titanium-containing ores by monitoring titanium oxychloride present in passivated crude titanium tetrachloride comprising the steps: (a) rapidly mixing into a chlorinator discharge stream, where the stream comprises predominately vapor in the presence of liquid mist and solids, an aluminum chloride-passivating agent to form in the process stream an essentially non-corrosive aluminum containing compound, and titanium oxychloride; (b) measuring in-process the concentration of titanium oxychloride in the chlorinator discharge stream or in the crude titanium tetrachloride; (c) comparing the measured concentration of titanium oxychloride to that of an aim point concentration of titanium oxychloride; and (d) adjusting the rate of addition of the aluminum chloride-passivating agent to restore or maintain the concentration of titanium oxychloride at the aim point (note claim 1).

Cronin '182 teaches that the presence of titanium oxychloride in the process stream indicates that the aluminum chloride has been passivated (note paragraph [0031]) and the formation of titanium oxychloride represents a loss of titanium value (note paragraph [0032]). Thus, it would have been obvious to one skilled in the art to have verified the presence of aluminum impurity in the titanium tetrachloride stream before adding the aluminum passivating agent in order prevent losing titanium value. Cronin '182 also discloses that the probe or detector may be located in the immediate vicinity of (which can be immediately before or immediately after) the addition point for the aluminum chloride passivating agent or downstream and its actual location is not critical as long as it is located in an area where the titanium oxychloride will be in solution (note paragraph [0034]).

It would have been obvious to one skilled in the art to have monitored the titanium oxychloride discharge to maintain the concentration of titanium oxychloride at the aim point. Thus, titanium oxychloride would always have been detected, and no additional aluminum passivating agent is needed to be mixed with the passivated discharge (note "if titanium oxychloride is absent" language in the instant claim 12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further remove the aluminum impurity from the titanium tetrachloride of Frey '021 by using a known and conventional process as suggested by Kay '881 because aluminum is a common impurity in the titanium tetrachloride and it is desirable in the art to remove such aluminum impurity because it is highly corrosive (note Kay '881, column 1, lines 36-46).

For (2) Cronin '182 is applied as stated above to teach the in-process, real time control loop for the process of removing aluminum chloride from titanium tetrachloride to prevent the losses of titanium and the losses of service time from corrosion of equipment and the formation of unwanted deposits.

For the order of removing Al, V, see Ex parte Rubin , 128 USPQ 440 (Bd. App. 1959) (Prior art reference disclosing a process of making a laminated sheet wherein a base sheet is first coated with a metallic film and thereafter impregnated with a thermosetting material was held to render prima facie obvious claims directed to a process of making a laminated sheet by reversing the order of the prior art process steps.). See also In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results.)

Applicant's arguments with respect to claims 12-19 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner can normally be reached on Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngoc-Yen M. Nguyen/
Primary Examiner, Art Unit 1793

nmn
August 2, 2010